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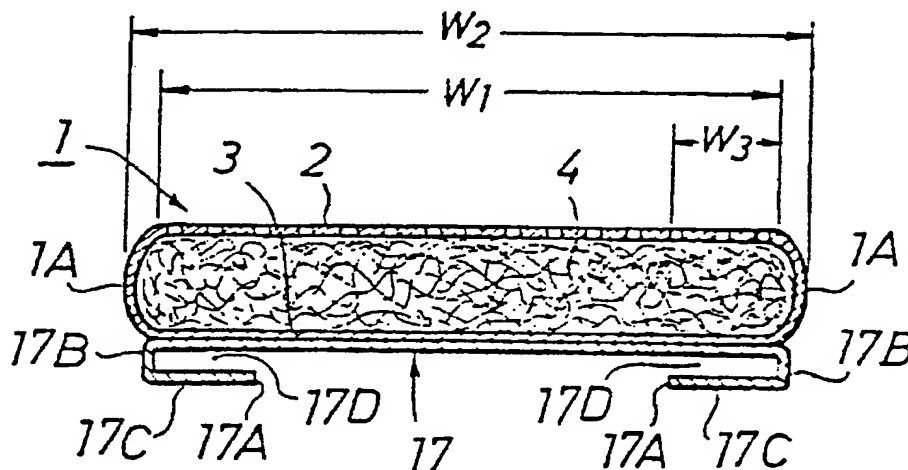
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(54) Absorbent article, e.g. a sanitary towel or pad

(57) An absorbent article includes a liquid permeable sheet 2, a liquid impermeable sheet 3 and a liquid retentive absorbent element 4 interposed therebetween which together constitute an elongate absorbent body, and a fixing device 17 which is secured to the liquid impermeable sheet 3. The fixing device 17 includes two pre-formed fixing elements 17C adapted to hook around the edges of the crotch portion of a pair of briefs (Fig. 16). A method of forming the fixing device is described with reference to (Figs. 17 to 19). The elements (17C) may be provided with gripping projections (17F, Fig. 21) or with adhesive areas (18, 19, Figs. 22 and 23). Modified forms of the overall fixing device are described with reference to (Figs. 24 to 27).

Fig .14



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Fig .1

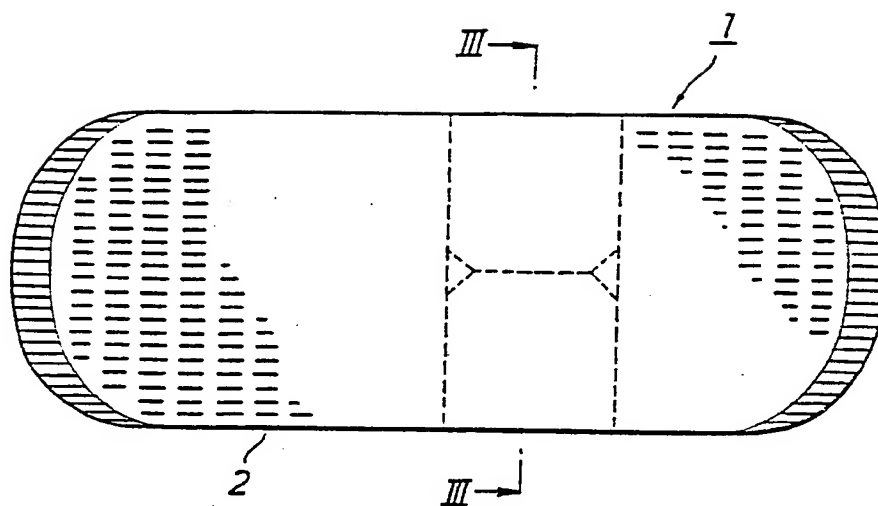


Fig .2

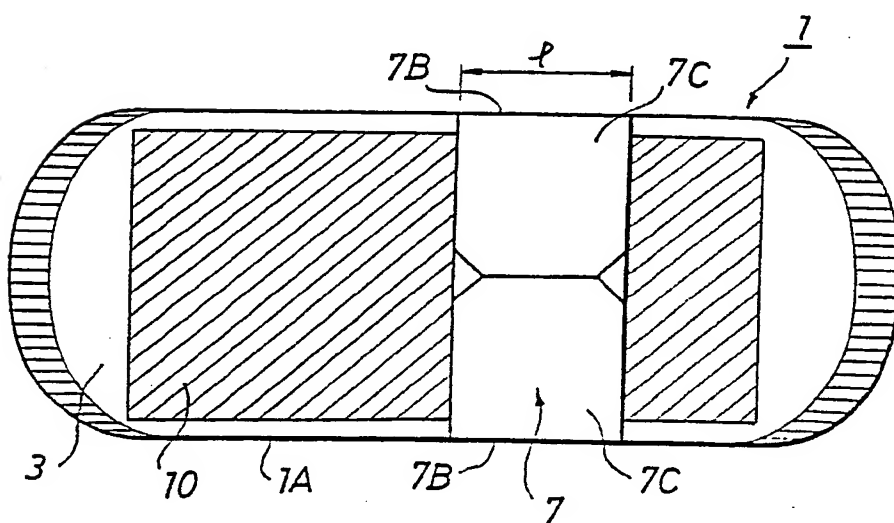


Fig .3

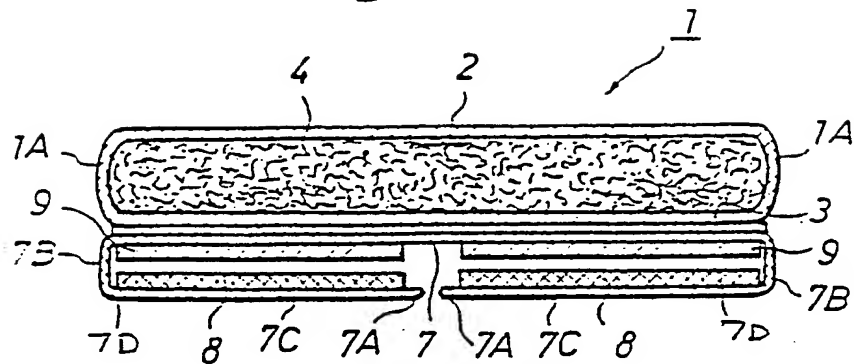


Fig . 4

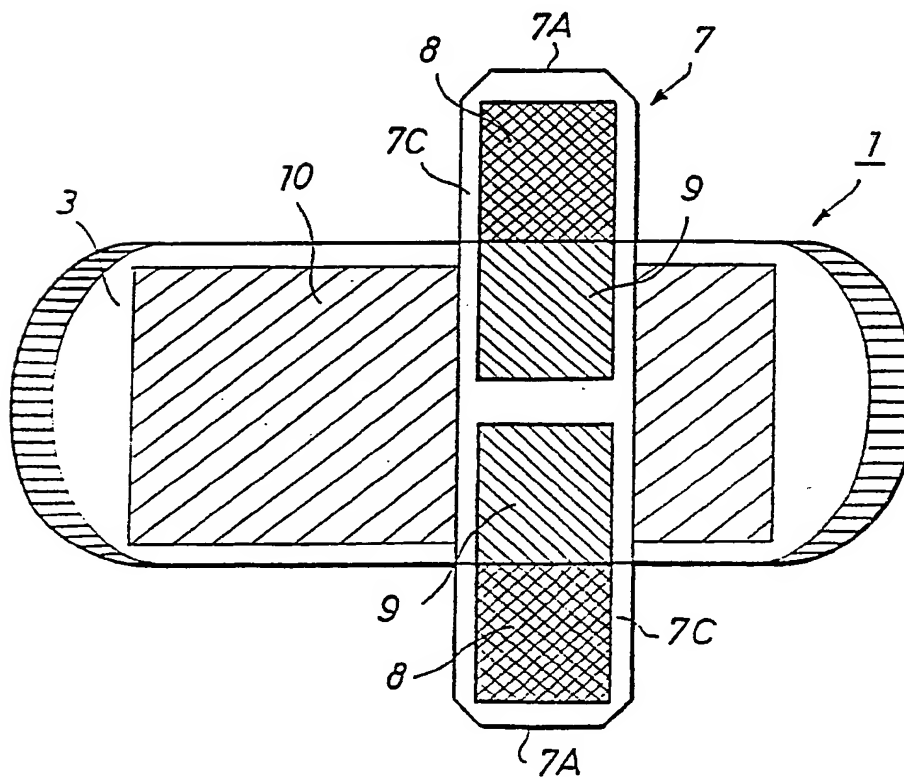


Fig .5

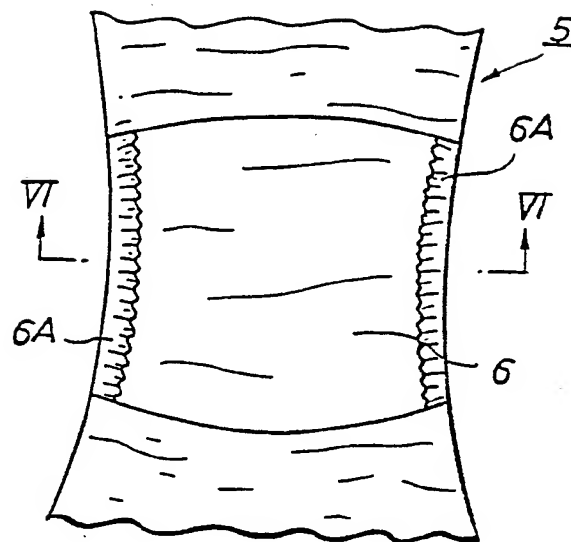


Fig .6

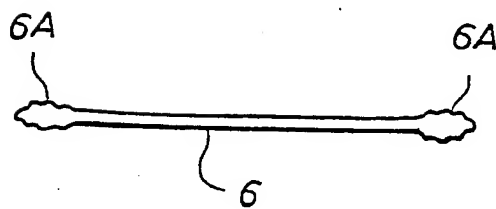


Fig .7

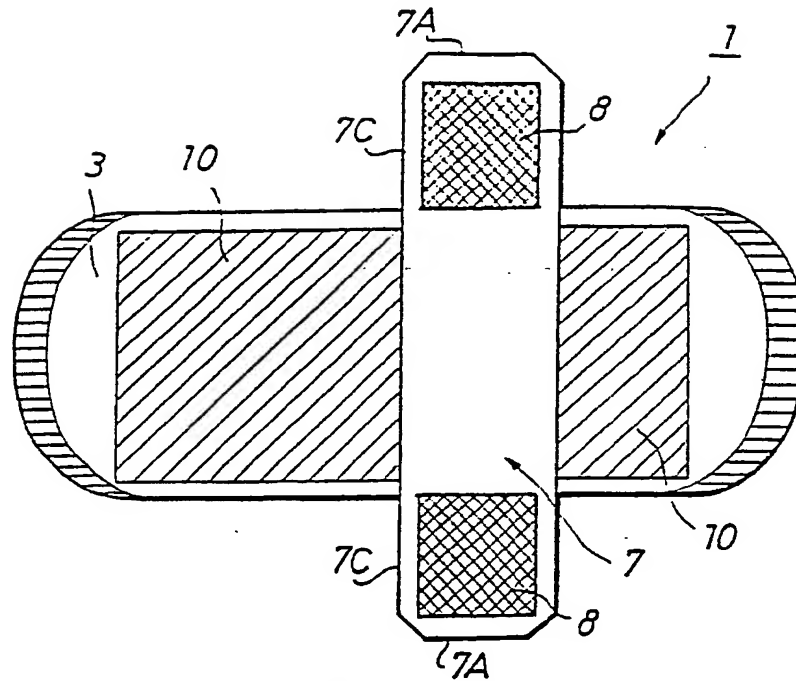


Fig .8

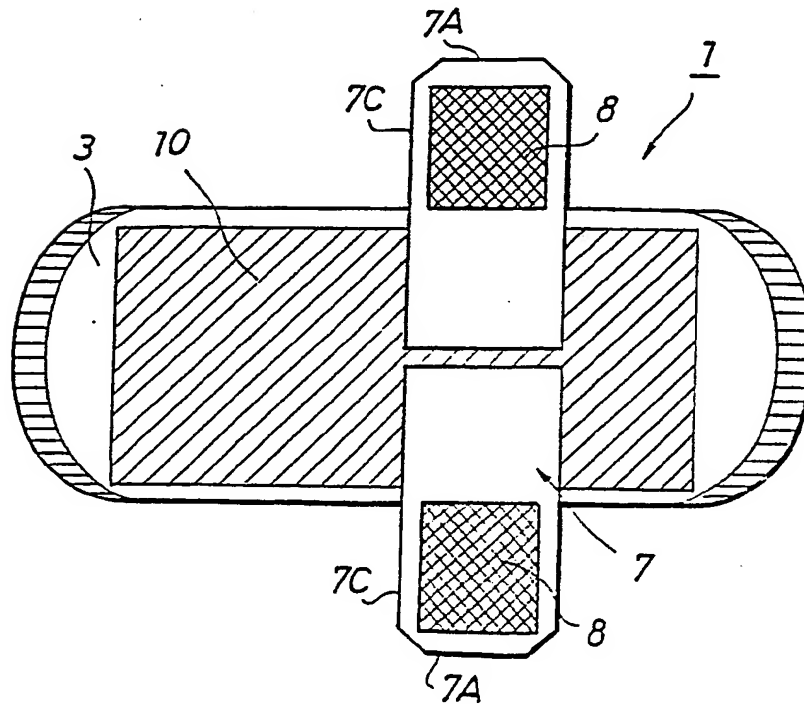


Fig .9

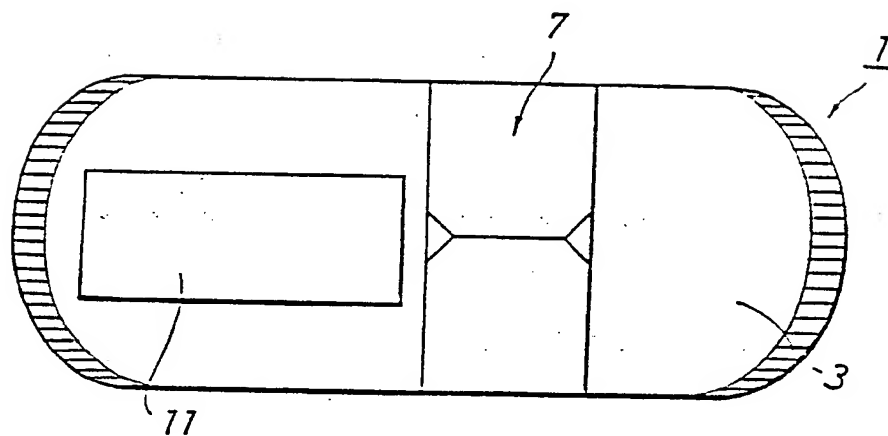


Fig .10

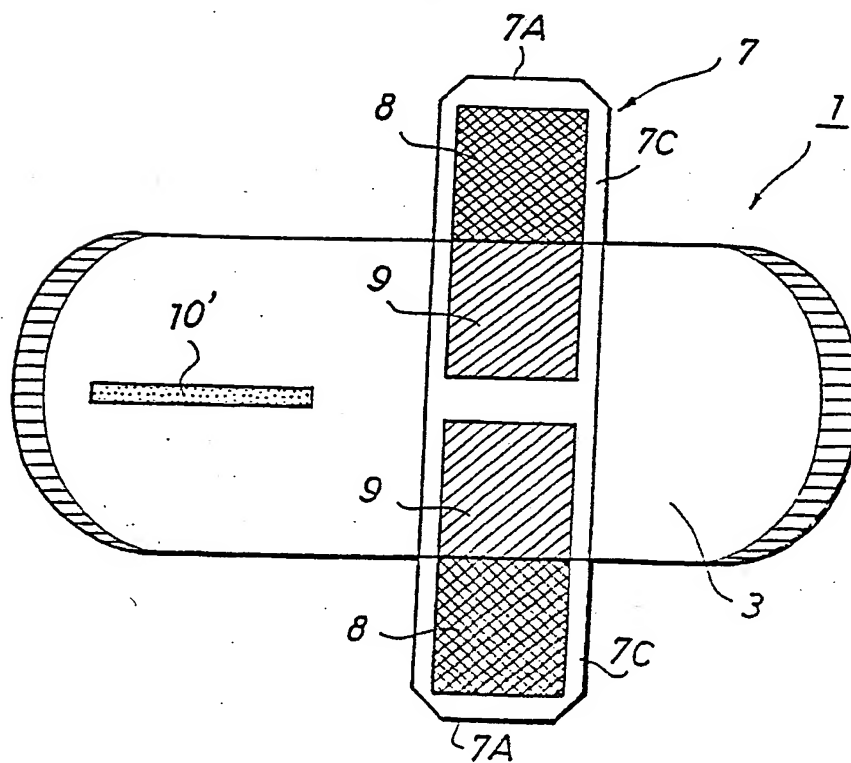


Fig .11

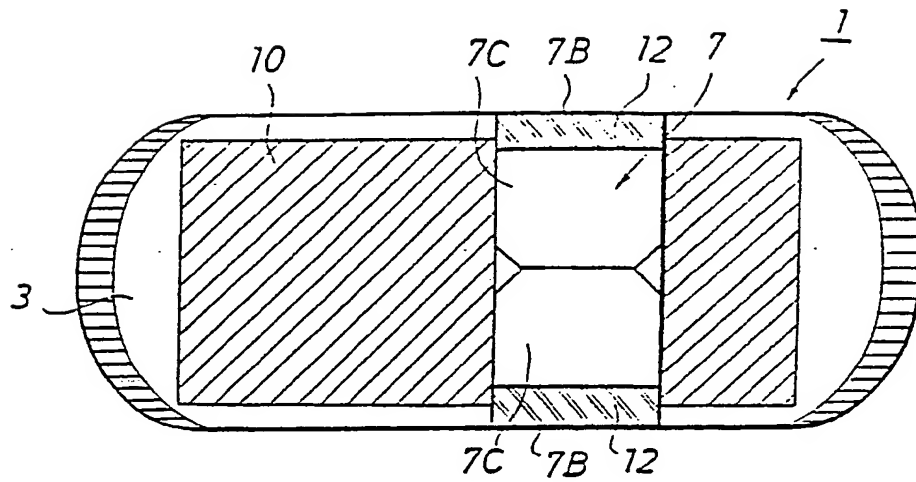


Fig .12

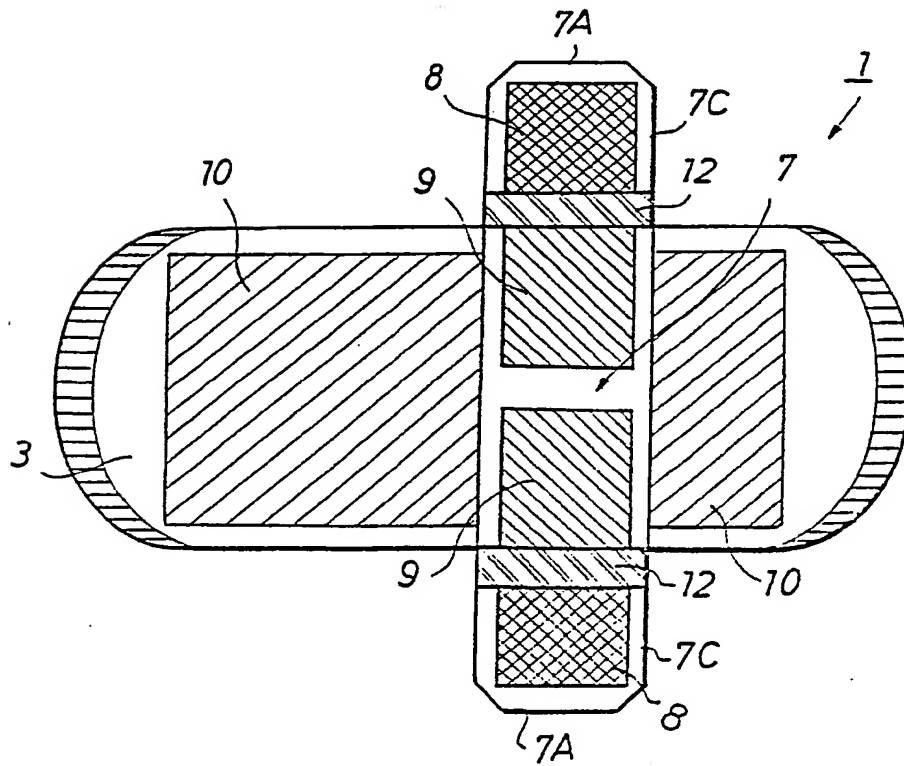


Fig .13

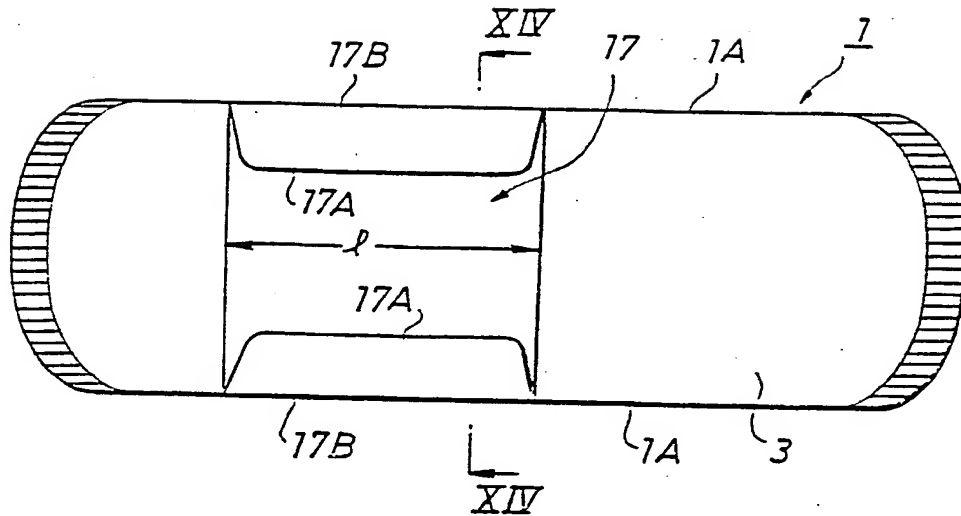


Fig .14

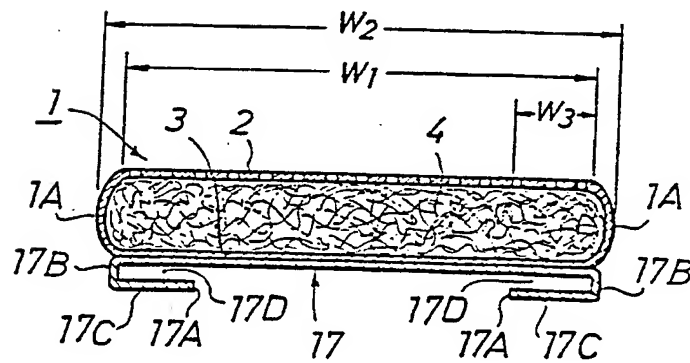


Fig .15

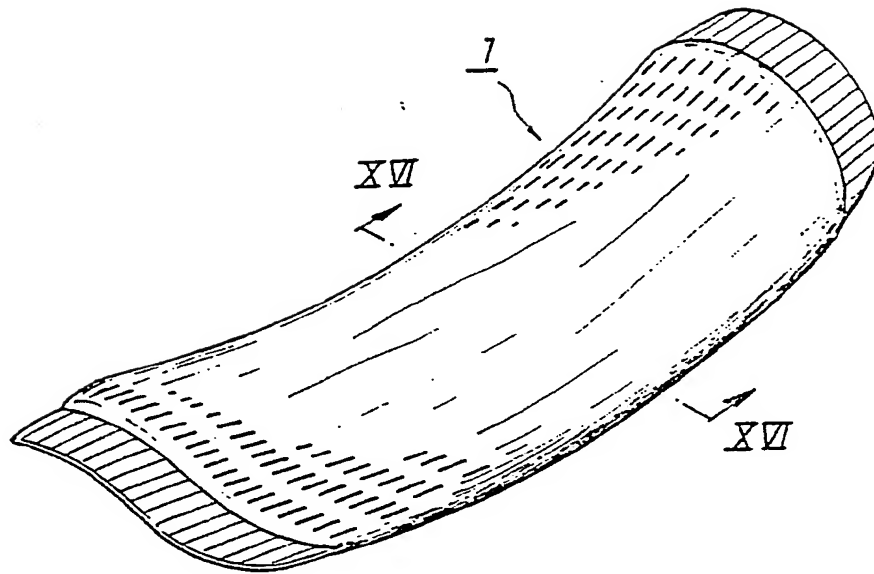


Fig .16

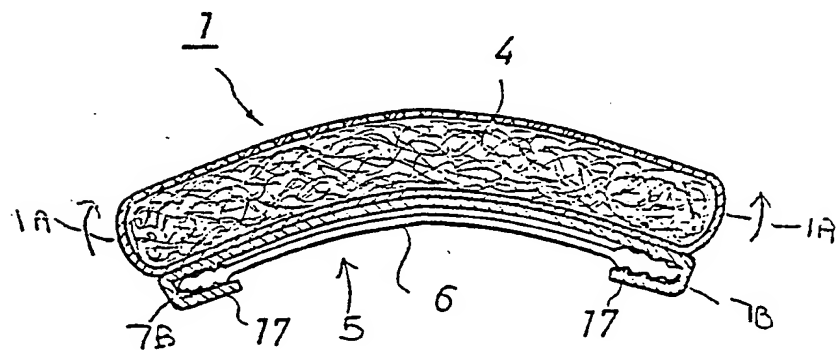


Fig .17

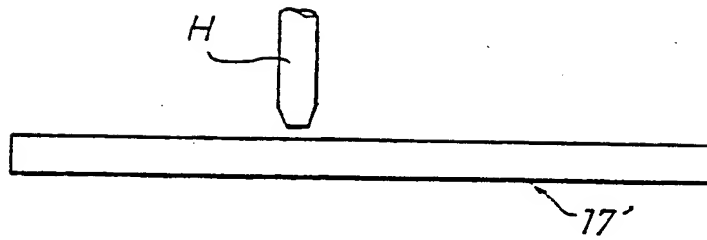


Fig .18

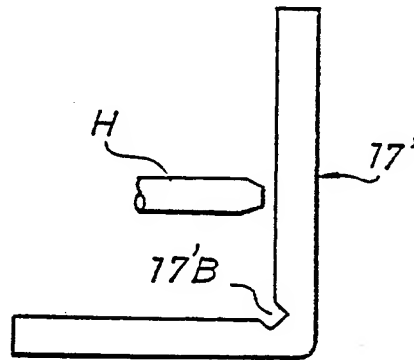


Fig .19

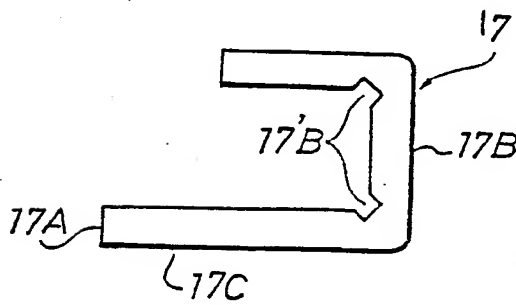


Fig .20

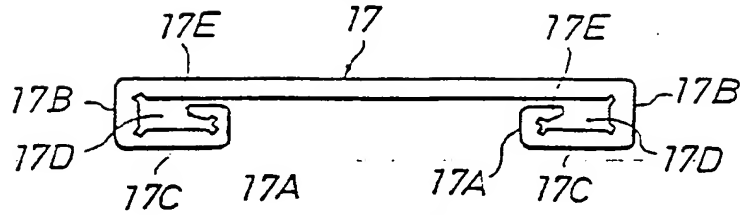


Fig .21

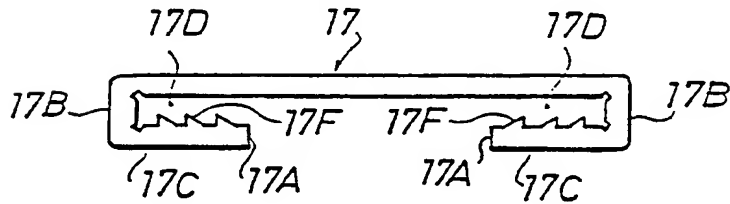


Fig .22

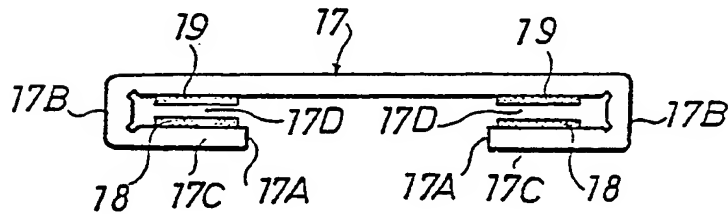


Fig .23

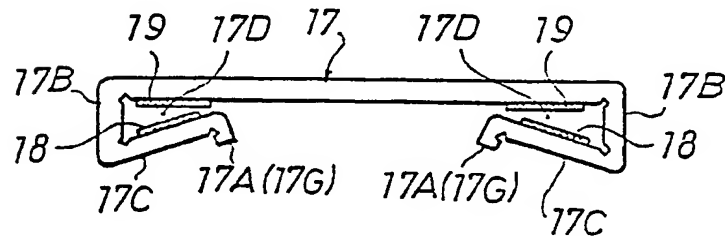


Fig .24

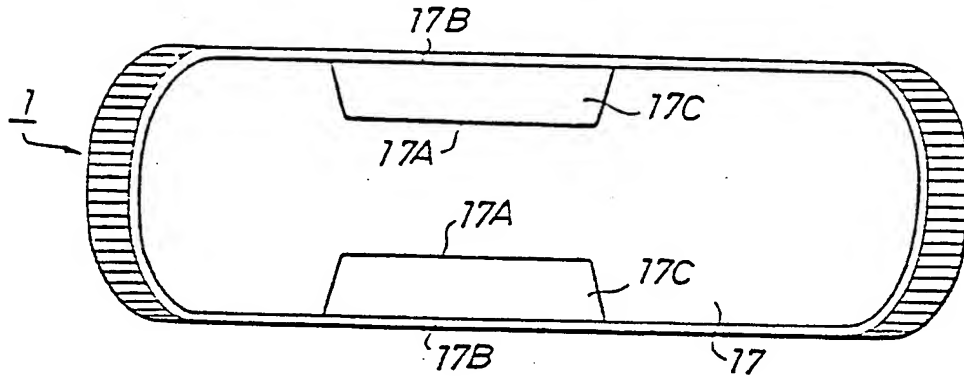


Fig .25

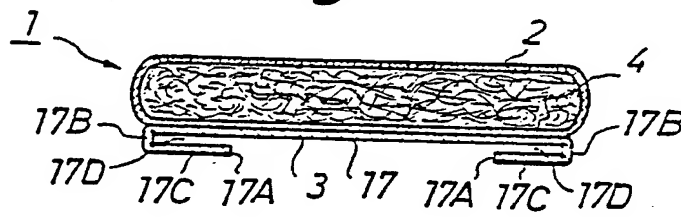


Fig .26

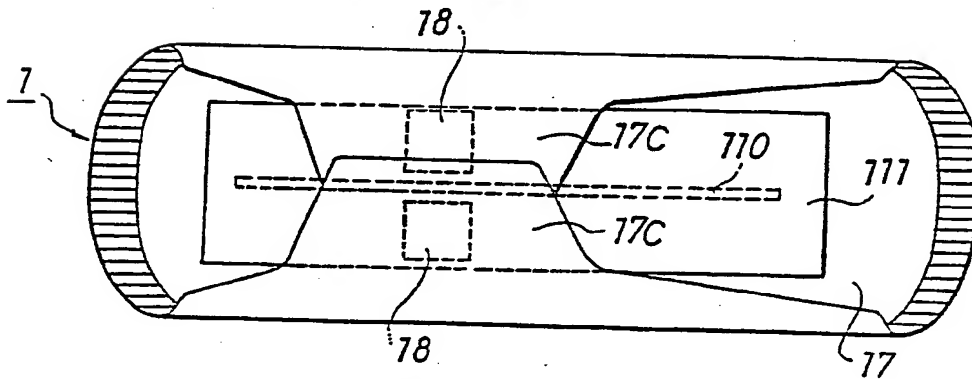
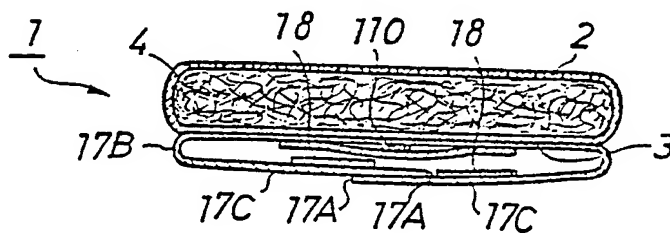


Fig .27



ABSORBENT ARTICLE

This invention relates to an absorbent article such as a napkin or pad for incontinence or catamenial purposes, e.g. a sanitary towel or pad, which is intended to be worn together with or within an undergarment (hereinafter "briefs") in the crotch region.

Conventional absorbent articles, such as catamenial napkins, basically include a liquid permeable inner layer, a liquid impermeable outer antileakage layer and a liquid retentive absorbent element interposed therebetween. In recent years the absorptive ability of such articles has increased due to the development and introduction of new materials, such as absorbent polymers, for the absorbent element instead of the conventional cotton-like pulp or absorbent paper. It has also been proposed that a liquid permeable sheet, which is rendered permeable by forming tiny perforations in a hydrophobic sheet, together with a non-woven fabric as a conventional fibre aggregate be used as the outer sheet in order to improve the absorptive ability.

However, even in an absorbent article which incorporates a new material and in which each component element has a high efficiency, sideward leakage of fluid still occurs frequently in actual use. For example, in the case of catamenial napkins, blood leaks sidewardly due to one reason or another and ultimately reaches the briefs, which is an inconvenient phenomenon and means that the full potential efficiency of the absorbent napkin has not been fully realised.

Regardless of the efficiency of each individual component, the three main causes of leakage of catamenial napkins are as follows:-

(1) When the user fixes a catamenial napkin to briefs, its position is inevitably offset either to the left or the right with respect to the crotch portion of the briefs and there is a portion of the crotch which is not adequately protected by the napkin from the beginning.

(2) Even if the user successfully fixes a catamenial napkin in the generally correct position, i.e. in the generally central area of the briefs, the napkin is frequently twisted or deformed, in use, into a rolled-up state in which a longitudinal edge of the napkin overlaps with the central portion because of movement of the user, and an edge region of the crotch portion which was initially covered by the napkin becomes exposed due to such deformation.

(3) When the user moves vigorously, it is impossible to fix a catamenial napkin firmly to the crotch portion of briefs only by fixing means such as adhesive, which is usually provided, and the napkin is displaced from its desired position to expose a portion of the crotch portion.

Leakage caused by the above factors is also greatly affected by the briefs which are worn. For example, if the width of the crotch portion, in particular, is substantially greater than that of the napkin or if the fit with the user's body is bad and loose, leakage tends to occur comparatively easily.

In order to solve these problems, many proposals have been made in which an absorbent article is provided with a pair of flexible flaps extending in the

widthwise direction away from the central portion of a respective longitudinal edge of the absorbent article (Japanese Patent Early Laid-open Publication Nos. Sho 60-75058 and Hei 1-111002). In this case the crotch portion of the briefs, when in use, is sandwiched and retained between the flaps in order to stabilise the absorbent article in the briefs, thereby improving its antileakage properties.

For example, the sanitary napkin described in Japanese Patent Early Laid-open Publication No. Sho 60-75058 is designed such that extending from the centre of each of the vertical sides of the absorbent layer there is a flexible flap formed of liquid permeable material and liquid impermeable antileakage material, which flap, in use, can be pulled out from the edge of the briefs and fixed to the outer surface of the briefs by fixing and connecting means disposed on the rear surface of the flap, thereby locating and stabilising the sanitary napkin and improving its antileakage properties. In order that this sanitary napkin may exhibit its full antileakage capability, it is important that the absorbent layer be positioned so that both sides face upward when the briefs are worn. If the briefs are worn in this manner as just mentioned, leakage can be prevented to some extent, but the following problems arise:

A). The pulling out of the flaps from both sides of the crotch of the briefs does not always leave the napkin correctly positioned so that it is sometimes displaced or twisted into an irregular form ab initio, whereby leakage occurs.

B) If the width of the crotch portion of the briefs is greater than that of the absorbent layer, it

is difficult to fix the sanitary napkin to the briefs or it can happen that the napkin cannot be firmly secured to the crotch portion because a region of the crotch portion is bent thereby reducing its area.

C) Even if the pair of flaps are firmly secured in position and an antileakage wall portion is successfully formed at each side of the absorbent layer, it sometimes happens that the antileakage wall portion is twisted toward and contacts the outer surface of the absorbent layer and stains the flaps with blood. Thus although staining of the briefs can be prevented by the flaps to some extent, it sometimes happens that even the flaps become stained while the wearer is moving and the inner crotch portion becomes stained with blood by the stained flaps.

In any event, if the known absorbent articles described above are correctly fixed in the right position with respect to the briefs, leakage due to reasons 1 to 3 above can be prevented to some extent, but if the briefs are a poor fit to the user's body or have a crotch portion which is wider than the absorbent layer, the flaps cover the outer surface of the absorbent article. As a result, leakage can not necessarily be prevented effectively and the flaps become stained and in turn stain the inner crotch portion with blood.

An object of the present invention is thus to provide an absorbent article, such as a sanitary towel, which can simply and reliably be secured to an undergarment, such as a pair of briefs, regardless of the shape of the undergarment and its fit to the user's body and which is scarcely twisted or deformed even if the user is physically active and which can maintain

its initial position throughout its period of use and which furthermore can effectively prevent leakage, particularly sideward leakage.

After a lengthy investigation the inventors have determined that the above objects can be achieved by the use of suitable fixing means for fixing the absorbent article to the undergarment.

According to the first aspect of the present invention there is provided an absorbent article including a liquid permeable sheet, a liquid impermeable sheet and a liquid retentive absorbent element interposed therebetween, which together constitute an elongate absorbent body, and a fixing device which is secured to the liquid impermeable sheet and is adapted to fix the absorbent body to the crotch portion of briefs, the fixing device including a securement portion, which is secured to the liquid impermeable sheet, and two fixing elements, each of which carries an adhesive area and is movable between a first position in which its adhesive area is separably adhered to the securement portion and a second position in which it projects laterally beyond the absorbent pad. Thus when the absorbent article in accordance with the invention is sold the fixing elements are disposed in their first position, that is to say adhered to the securement portion of the fixing device, i.e. parallel and very close to the impermeable sheet. When the absorbent article is to be used, the fixing elements are moved into their second position and the impermeable sheet is placed against the inner surface of the crotch portion of a pair of briefs and the fixing elements are then returned substantially to their first position but the adhesive areas are adhered

to the outer surface of the crotch portion of the briefs. The lateral edges of the crotch portion are thus sandwiched between the fixing elements and the absorbent pad and the latter is thus secured to the briefs. It is found that the sanitary article is reliably retained in position, even if the user is physically active, and that there is thus no tendency for leakage to occur.

In one embodiment of the invention at least one further adhesive area is provided on the securement portion of the fixing device and positioned so that it adheres to the adhesive area on the fixing elements when the latter are in the first position. The adhesive is such that the adhering adhesive areas may be readily separated and when the absorbent article is applied to the crotch portion of briefs the further adhesive areas adhere to the inner surface of the briefs and thus provide yet further positional stability. Alternatively or additionally, a further adhesive area may be provided on the surface of the impermeable sheet, that is to say remote from the fixing device. Due to the low adhesive strength and ready separability of the adhesive areas, they do not require a removable cover sheet or the like.

The two fixing elements may be separate elements or they may constitute a single member which extends across the width of the absorbent body. Each fixing element is hingably connected to the remainder of the fixing device and this hinge may be constituted by extensible elastic material.

According to a second aspect of the present invention there is provided an absorbent article having a liquid permeable sheet, a liquid impermeable sheet

and a liquid retentive absorbent element imposed therebetween, which together constitute an elongate absorbent body, and a fixing device which is secured to the liquid impermeable sheet and is adapted to fix the absorbent body to briefs, the fixing device including two fixing elements, each of which includes a retaining portion which extends inwardly substantially from a respective longitudinal edge of the absorbent body. The retaining portions thus define, together with the absorbent body or a further portion of the associated fixing element, spaces into which the edge portions of the crotch region of briefs may be inserted and retained. In practice, the fixing elements will be of resilient material, or at least include a resilient portion, whereby the retaining portions may be moved temporarily away from the absorbent body to permit the introduction of an edge of the crotch portion of the briefs whereafter the retaining portion is permitted to return under the action of the resilience to a position in which it engages the crotch portion and traps it between itself and the absorbent body whereby the absorbent article is secured to the briefs.

It is preferred that each fixing element includes a side portion which extends from the absorbent body to the retaining portion, the side portion being formed of resilient material. The side portion and the retaining portion may constitute a single member which is plastically deformed at their junction.

Further features and details of the present invention will be apparent from the following description of certain specific embodiments which will be given by way of example with reference to the accompanying drawings, in which:

Figure 1 is a plan view of the inner surface of one embodiment of catamenial napkin in accordance with the present invention;

Figure 2 is a view of the lower or outer side of the napkin of Figure 1;

Figure 3 is a sectional view on the line III-III in Figure 1;

Figure 4 is a view similar to Figure 2 showing the fixing devices in an unfolded state;

Figure 5 is a plan view of a crotch portion of a pair of briefs;

Figure 6 is a sectional view on the line VI-VI in Figure 5;

Figures 7 and 8 are views corresponding to Figure 4 showing two further embodiments of catamenial napkin in accordance with the present invention;

Figure 9 is a view corresponding to Figure 2 showing a further embodiment of catamenial napkin in accordance with the present invention;

Figure 10 is a view corresponding to Figure 4 of the napkin of Figure 9;

Figure 11 is a view corresponding to Figure 2 showing a further embodiment of catamenial napkin;

Figure 12 is a view corresponding to Figure 4 of the napkin of Figure 11;

Figure 13 is a view of the back or outer side of one embodiment of catamenial napkin;

Figure 14 is a sectional view on the line XIV-XIV of Figure 13;

Figure 15 is a perspective view showing the shape of the napkin of Figure 13, when in use;

Figure 16 is a sectional view on the line XVI-XVI of Figure 15;

Figures 17, 18 and 19 are explanatory views showing successive steps in the formation of a fixing device;

Figures 20, 21, 22 and 23 are views corresponding to Figure 14, showing yet further embodiments of the present invention;

Figure 24 is a view of the back or lower side of a further embodiment of catamenial napkin;

Figure 25 is a transverse sectional view of the napkin of Figure 24; and

Figures 26 and 27 are views corresponding to Figures 24 and 25 showing yet a further embodiment of absorbent article in accordance with the present invention.

Referring firstly to Figures 1 to 4, the catamenial napkin has a liquid permeable outer surface material forming the topsheet 2, which is intended to contact the user's skin, a liquid impermeable material forming the lower antileakage sheet 3, which is intended to contact the user's briefs and a liquid retentive absorbent layer or element 4 interposed between the sheets 2 and 3, and of generally elongate shape. The topsheet 2 and antileakage sheet 3 may be integrally formed as shown in Figures 1 through 4, and in this case that portion of the liquid impermeable sheet which constitutes the permeable topsheet 2 is provided with a plurality of tiny perforations to render it permeable whilst the remainder has no perforations and constitutes the antileakage sheet 3. The napkin 1 is provided with a fixing device 7 secured by adhesive or the like to the antileakage sheet 3 and adapted to fix the napkin 1 to the crotch portion 6 of briefs 5 shown in Figures 5 and 6.

The fixing device 7, as shown in Figure 2, is offset forwardly in the longitudinal direction of the napkin 1 from its centre, and is longer than the width of the napkin 1 when the fixing device 7 is opened out, as shown in Figure 4. In the latter state the napkin 1 has a wing portion 7C extending laterally outwardly from each longitudinal edge. The wing portions have free ends which are normally bent inwardly through 180° so that they contact each other at the longitudinal centre of the body of the napkin 1. The fixing device thus normally constitutes two opposed horizontal U profiles whose openings are adjacent to and directed towards one another. Each U profile thus has one limb fastened to the sheet 3, a base or side portion 7B and another limb 7C spaced from the first limb and parallel to it. The side portions 7B lie generally in the same plane as the side surfaces 1A of the napkin. The limbs 7C constitute fixing elements or wings which may be bent about the portions 7B between the positions shown in Figures 2 and 3.

As shown in Figure 3, the fixing device 7 is designed such that the longitudinal edge portions 6A of the crotch portion 6 of the brief 5 are held in the spaces 7D defined by the U profiles so that the napkin is fastened to the crotch portion 6. Furthermore, the inner surfaces of the limbs of the U profiles, i.e. those surfaces which, in use, are adjacent to the crotch portion 6, are provided with respective adhesive areas 8, 9 so that the body of the catamenial napkin 1 is reliably fixed to the briefs 5 by adhering the fixing device 7 to the adhesive areas 8 and 9. The adhesive used in the adhesive areas 8 and 9 is of the type having a weak adhesive strength which requires no

cover sheet. One example of such adhesive is disclosed in Japanese Utility Model Early Laid-open Publication No. Sho 59-153304. Each of the adhesive areas 8 and 9 constitutes a lower layer adjacent the fixing device 7 of an adhesive with a high adhesive strength and an upper layer of an adhesive with a low adhesive strength applied to it, thereby forming a two-layer structure. By virtue of the two-layer structure of adhesives, the adhesive portions 8 and 9 can firmly be adhered to the fixing device 7. On the other hand, since the opposing adhesive portions 8 and 9 adhere to each other with a relatively small adhesive strength they can be easily separated without using a release paper. As a result, the adhesive portions 8 and 9 can be readily adhered and separated with respect to each other. The strong adhesive is preferably of, for example, acrylic or rubber type, while the weak adhesive is preferably of, for example, acrylic type. The adhesive strength of these adhesives can be adjusted with respect to one another in a known manner. The U profiles may be of generally rectangular U shape but this is not essential and variations are possible.

An antislip surface 10 is provided on substantially all the exposed surface of the antileakage sheet 3, so that it is not readily displaced from its position relative to the briefs 5. The antislip surface 10 can be formed by applying, for example, a polymer having a glass transition temperature of 0°C or less and foamed expandable polymer beads which are described in Japanese Patent Early Laid-open Publication No. Sho 63-73959.

The outer sheet 2, antileakage sheet 3 and absorbent element 4 are preferably of materials known

per se.

The mode of use of the catamenial napkin 1 is as follows:

Initially, each of the wing portions 7C, 7C of the fixing device 7 is separated from the body of the catamenial napkin 1, which is in the state shown in Figure 2, and folded into the state shown in Figure 4 in which the wing portions 7C extend beyond the body of the napkin 1. The napkin 1 is brought into alignment with the crotch portion 6 of the briefs 5, shown in Figures 5 and 6, and fixed to the crotch portion 6 by the adhesive areas 9. The wing portions 7C are then bent inwardly from the edge portions 6A to enclose the crotch portion and the adhesive areas 8, 8 on the wing portions 7C, 7C are adhered to the outer surface of the crotch portion 6, thereby fixing the napkin 1 to the crotch portion 6. If the briefs 5 with the catamenial napkin 1 adhered thereto in the manner described are worn, the napkin 1 remains in its initial position intimately adjacent to the crotch portion of the wearer.

Since the portions of the fixing device 7 are merely weakly adhered to each other by the adhesive areas 8 and 9, the wing portions 7C may be easily pulled away and spread whereafter the adhesive areas 9 are adhered to the inner surface of the crotch region 6, the wing portions 7C are then bent back again and the adhesive areas 8 adhered to the outer surface of the crotch region. Accordingly, the fixing operation is very simple and no positional error will occur. When the briefs are worn, the presence of the antislip surface 10 means that the napkin 1 can be reliably fixed to the crotch portion 6 by the adhesive areas 8

and 9 and is not displaced but is retained in its initial position by the adhesive areas 8 and 9. Even if the shape of the crotch portion of the briefs should substantially change due to physical activity or movement of the user, the body of the napkin 1 is not displaced by following these changes, whereby the napkin 1 is not twisted. As a result, there is no risk that the briefs 5 and inner crotch portion are stained with blood. Furthermore, since the adhesive areas 8 and 9 require no separate expensive release paper or the like, the expense of this paper is saved and the cost of the napkin is reduced.

The modified napkin 1 shown in Figure 7 is similar to that described above except that the adhesive areas 9 are omitted. Similarly, the modified napkin 1 shown in Figure 8 is again similar except that the fixing device 7 is centrally divided into two in the width direction. The operation and advantages of these embodiments are very similar to those of the first embodiment but the expense of the adhesive areas 9 is saved.

The napkin 1 shown in Figures 9 and 10 is again very similar but instead of the antislip surface 10 over generally the entire surface of the antileakage sheet 3, adhesive is applied to a generally central area behind the fixing device 7 to form an adhesive area 10' and a release paper 11 is attached to it. The function and advantages are again very similar.

The napkin 1 shown in Figures 11 and 12 is again very similar but the side portions 7B of the fixing device 7 are constituted by expansible elastic members 12. The expansible members 12 follow radical changes of shape of the crotch portion 6 caused by physical

activity when the napkin 1 is worn, and loads applied to the adhesive areas 8 and 9 are absorbed and reduced by expansion and construction of the elastic members 12 thus enabling the napkin to be retained more stably in position.

The absorbent article of the present invention is not limited to the constructions of the fixing device described above and all that is necessary is that a pair of fixing elements extend outwardly in the width direction from the longitudinal edges of the body of the absorbent article and that an adhesive area is disposed on at least the rear side of each of the fixing elements, and the fixing elements can be adhered to and separated from the rear of the body of the absorbent article. For example, the fixing device may be designed so that the free ends of the fixing elements are bent in order to facilitate their being easily pulled out.

Furthermore, the fixing element of the present invention may also be designed so that by non-elastically deforming the edge portions 7B a bending habit or bias is imparted which tends to fold the free ends 7A inwardly, whereby the wing portions 7C are normally held against the rear of the body of the napkin.

Turning now to Figures 13 to 16, the catamenial napkin 1 illustrated therein is of generally elongate shape and has a liquid permeable outer surface material constituting a topsheet 2, which is intended to contact the user's skin, a liquid impermeable material constituting an antileakage sheet 3, which is intended to contact the user's briefs, and a liquid retentive absorbent element or layer 4 interposed between them.

The topsheet 2 and antileakage sheet 3 may be integrally formed as described above.

The antileakage sheet 3 is provided with a fixing device 17 adapted to fix the catamenial napkin 1 to the crotch portion 6 of briefs 5 shown in Figures 5 and 6. The fixing device 17 is offset in the longitudinal direction from the centre of the napkin 1. The fixing element 17 includes a planar portion which is secured to the outer surface of the impermeable layer 3 and extends across its width and has a length 1 in the longitudinal direction of the napkin. At the longitudinal edges 1A of the napkin the fixing element is bent through 90° and is connected by side portions 17B, which are generally parallel to the sides 1A of the napkin, to fixing elements or wings 17C which are parallel to and spaced from the planar portion and terminate in free edges 17A. The fixing device 17 thus defines two horizontal opposed U profiles, the free ends 17A of one limb of each of which is disposed within the cross section of the napkin, when viewed in plan. The fixing elements 17C are formed between the free ends 17A and the side portions 17B. The fixing device 17 defines spaces 17D within the U profiles, i.e. between the fixing elements 17C and the rear of the body of the napkin 1, which spaces 17D are adapted to receive a respective edge 6A of the crotch portion 6 of the briefs 5, thereby fixing the napkin 1 to the crotch portion 6.

The aforementioned horizontal U shape which is opened up either in the right-hand side or in the left-hand side may be [shape or] shape or any other suitable shapes. As long as the side portions 17B, 17C are folded back, the shapes of the respective portions

are not particularly limited.

The length 1 of the fixing device 17 is preferably between 20 and 120mm, taking into consideration the retaining function in the spaces 17D, the material of the fixing device 17, and the mouldability of the bent portions 17B, and more preferably between 50 and 100mm. Due to the fact that the ends of the absorbent portion of the napkin are bowed, the width W_1 over which the fixing device may be secured is less than the total width W_2 of the napkin. The width W_1 is not crucial but this should not be significantly different to W_2 and it is preferred that

$$W_2 - W_1 < 10$$

Since the width of the catamenial napkin 1 is, typically, 60 to 80mm, the width W_1 of the fixing device 17 is preferably 50 to 70mm.

The width W_3 of the fixing elements 17C is also not particularly crucial but it is preferably 10 to 20mm to permit an easy fixing of the napkin 1 to the crotch portion 6. In the crotch portion 6 of the shorts 5, both edges 6A, 6A of the crotch portion are typically trimmed with an expansible rubber, lace or the like and, therefore, have some thickness.

The side portions 17B are constructed so that their free edges 17A are naturally retained within the cross section of the absorbent layer and are also plastically deformed so that the fixing elements 17C are normally held in their illustrated position. The fixing device 17 thus has such an ability to maintain its shape so that when the free edges 17A are grasped and moved away from the body of the napkin 1 in order to release the fixing device 17, the free end 17A is

swung back towards the body of the napkin 1 under its own resilience when it is released and is thus returned to its initial position.

One example of a method for moulding the fixing device 17 will be briefly described with reference to Figures 17 to 19. Firstly, a sheet material formed of a polyolefin foam, a polyurethane foam or the like is cut to a predetermined size to make a sheet 17'. Then, a heated edge H is pushed against the sheet 17' at a predetermined position, as shown in Figure 17, thereby causing the heating portion 17'B of the sheet 17' to contract and to fold through 90°, as shown in Figure 18. The process is then repeated at an adjacent predetermined position to fold the sheet 17' through a further 90°, as shown in Figure 19, to form one side of the fixing device 17. The portion between the two folds or bends constitutes a side portion 17B in the fixing device 17. The fixing device 17 of this embodiment is thus a single integral component. If the sheet 17' is contacted by a heating edge H having a higher temperature, it can be folded through 180° at a time.

Although there is a wide range of choices available for the material used for the fixing device 17, this material is preferably one of or a mixture of two or more of polyethylene, polypropylene, polyvinyl chloride, ionomer resin and modified resin thereof. The form in which such material is processed is preferably a film (single layer or multilayer), an independent foam sheet, a communicating foam sheet or the like.

The topsheet 2, backsheet 3 and absorbent element 4 are preferably of materials known per se.

The method of using the catamenial napkin 1 is as follows:

Firstly, the fixing elements 17C of the fixing device 17 are held or moved to a position in which they are spaced from the body of the napkin 1, and the napkin 1 is then brought into engagement with the crotch portion 6 of the briefs 5 with the edge portions 6A thereof accommodated within the spaces 17D bounded by the fixing elements 17C. The fixing elements 17C are then released and they are naturally returned to their initial positions by the stresses acting on them and caused to enclose and trap the edges 6A of the crotch portion 6, thereby fixing the napkin 1 to the crotch portion 6. When the user wears the briefs 5 and the crotch portion 6 is pushed against the user's crotch, the napkin 1 is deformed into a saddle shape following the shape of the wearer's crotch, as shown in Figure 15. At that time the force for tightening the wearer's body acts in the direction of the arrows shown in Figure 16 from each edge 6A of the crotch portion 6. As a result, the curved side portions 1A of the napkin 1, and the areas slightly inside them of the side portions 17B of the fixing device 17 are pushed against the wearer's crotch, thereby reliably fixing the napkin 1 to the briefs 5.

Thus, in this embodiment, irrespective of the size of the briefs 5, the napkin 1 can be easily and reliably fixed to the crotch portion 6 by pulling out the fixing elements 17C and inserting the edges 6A of the crotch portion 6 of the briefs 5 into the spaces 17D. When the briefs 5 are worn, the areas slightly inside the side portions 1A of the napkin 1 are reliably pushed against the wearer's crotch by the

edges 6A of the crotch portion 6 to stabilise the position of the napkin 1. As a result, the napkin 1 is prevented from being twisted.

Since the fixing device 17 is located on the rear of the body of the napkin 1 and the fixing elements 17C are normally in contact with the outer surface of the crotch portion 6 and can be readily deformed in accordance with the shape of the user's crotch, even if the shape of the user's crotch should change radically due to physical activity, the napkin 1 is not displaced and the fixing elements 17C are not twisted towards the front surface and the fixing elements 17C do not become stained with blood. There is thus no risk that the user's crotch is stained with blood.

Figures 20 to 23 are sectional views of modified embodiments of catamenial napkin which differ from the preceding embodiment only as regards the configuration of the fixing device 17 and thus only the latter is illustrated in each case.

The fixing device 17 shown in Figure 20 is designed such that the free ends are folded back toward the side portions 17B whereby each fixing element 17C terminates at an edge 17E which is disposed within the associated spaces 17D and directed outwardly. Due to the presence of the folded-back portions 17E rigidity is imparted to each end 17A. In addition, since the folded-back portions 17E engage the thick portions of the edges 6A of the crotch portion 6, a more reliable fixing function of the fixing device 17 is obtained.

In the fixing device 17 shown in Figure 21, a plurality of projections 17F are formed on the surface of the fixing elements 17C directed towards the body of the napkin so that the strength of the engagement of

the fixing elements 17C with the crotch portion 6 is increased.

In the fixing device 17 shown in Figure 22, adhesive areas 18, 19 are provided on the opposed parallel surfaces defining the spaces 17D in order to more firmly retain the crotch portion 6 within the spaces 17D. The adhesive used for the adhesive areas 18 and 19 is preferably of the type having a weak adhesive strength which requires no release. One example of such an adhesive is described in Japanese Utility Model Early Laid-open Publication No. Sho 59-153304. Each of the adhesive areas 18 and 19 may be of two-layer structure, i.e. by forming each of them by applying an adhesive having a strong adhesive strength to the fixing device 17 side to serve as a lower layer and an adhesive having a weak adhesive strength thereon to serve as an upper layer. In this event the adhesive areas 18 and 19 are firmly adhered to the fixing device 17 and, even if they should become adhered to each other, they can easily be separated and no separate paper is required. Whilst the adhesive may be applied to the two opposed surfaces, it may also be applied to only one of them or to the surface opposite the projections 17F in the embodiment of Figure 21.

The strong adhesive is preferably, for example, of acrylic or rubber type, while the weak adhesive is preferably, for example, of acrylic type.

The fixing device 17 shown in Figure 23 is very similar to that shown in Figure 22 except that each free end 17A is folded through 90° away from the body of the napkin to form a handle portion 17G and each fixing element 17C is inclined so that its free end is closer to the body of the napkin than its other end.

Even if the adhesive areas 18 and 19 should adhere they can be easily separated by grasping the handle portions 17G.

The side portions 17B may be straight, as illustrated, or they may be curved similarly to the edges 6A of the crotch portion 6.

Figures 24 and 25 show yet a further embodiment which is very similar to that of Figures 13 and 14 except that the fixing device has a large planar portion which extends over the entire rear surface of the napkin 1, i.e. over the antileakage sheet 3.

Figures 26 and 27 show yet a further embodiment of a catamenial napkin 1 in which the fixing device extends over substantially its entire length and the fixing elements 17C partially overlap with one another and carry a respective adhesive area 18 on their inner surface. An elongate centrally disposed adhesive area 110, which is covered by a removable cover sheet 111 before being used, is provided on the planar portion of the fixing device 17 by which the napkin can be fixed to the crotch portion 6 of the briefs 5, as well as by the adhesive area 18. In other respects the napkin is similar to the napkin 1 shown in Figures 24 and 25.

The function and effect of the embodiments shown in Figures 24 through 27 are thus similar to those of the embodiments of Figures 13 and 14.

Although the fixing device 17 has been described as including a pair of fixing elements 17C integrally formed together, they may also be independent, as shown in Figure 19. In this case, a separate fixing device will be provided on each side of the napkin 1.

CLAIMS

1. An absorbent article having a liquid permeable sheet, a liquid impermeable sheet and a liquid retentive absorbent element imposed therebetween, which together constitute an elongate absorbent body, and a fixing device which is secured to the liquid impermeable sheet and is adapted to fix the absorbent body to briefs, the fixing device including two fixing elements, each of which extends inwardly substantially from a respective longitudinal edge of the absorbent body.

2. An article as claimed in Claim 1 wherein both side portions of said fixing device have a stress for naturally locating distal edge portions of the fixing elements in said internal area.

3. An absorbent article as claimed in Claim 1 or Claim 2, wherein both side portions of said fixing device is formed in a horizontal U shape, respectively.

4. An absorbent article as claimed in claim 2, wherein said stress is a bending habit.

5. An absorbent article as claimed in claim 1, wherein said pair of fixing element are provided inside thereof with an adhesive portion, respectively.

Relevant Technical Fields

- (i) UK Cl (Ed.M) A5R (RPA, RPC, RPF, RPG)
 (ii) Int Cl (Ed.5) A61F 13/15, 13/56, 13/58, 13/60

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 L V Thomas

Date of completion of Search
 7 March 1994

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-

1-5

(ii)

Categories of documents

- X: Document indicating lack of novelty or of inventive step. P: Document published on or after the declared priority date but before the filing date of the present application.
 Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
 A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X,E	EP 0446818 A2	(KIMBERLEY-CLARK) see lines 2-28 column 5, line 51 column 7 - line 21 column 8, lines 23-50 column 9 and Figures 9 and 14	1-4
X	EP 0337438 A1	(McNEIL-PPC) see line 31 column 3 - line 50 column 4 and Figure 2	1-4
X	GB 2214085 A	(KIMBERLY-CLARK) see line 13 page 6 - line 6 page 7 and Figures 16 and 17	1

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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